

Education and Public Participation Value to the Science Community and Vice Versa



**CERES SCIENCE TEAM MEETING
APRIL 26TH-28TH, 2016
NASA LANGLEY RESEARCH CENTER**

**SARAH MCCREA
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EDUCATION OUTREACH COORDINATOR
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CERES Education and Communication

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Science Communications and Education

Education Team

Lin Chambers, Lead
Ann Martin, Evaluator

Focus: CAN Award Education Components

NASA Champion: Lin Chambers

S'COOL/GLOBE Integration

Sarah McCrea
Support: Tina Rogerson

NASA Champion: Jessica Taylor/Lin
Chambers/Margaret Pippin

GLOBE at Langley Tina Harte

Support: Preston Lewis, Sarah
McCrea

NASA Champion: Lin Chambers

MY NASA DATA

Preston Lewis
Support: Tina Harte, Daniel
Oostra, Penny Oots

Continuing Mission Related Education Support

CERES

Lin Chambers

CALIPSO

Jessica Taylor

SAGE III on ISS

Kristyn Damadeo

TEMPO

Margaret Pippin

DISCOVER/KORUS-AQ

Amber Richards
Lin Chambers

Communications Team

Denise Lineberry

Aimee Amin
Jim Closs
Jay Madigan
Tim Marvel

** Additional Support from Translators Personnel (Camelia Dellar) and ASDC Personnel*

Changes in the NASA Education and Communication Model

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- Starting in 2015, Missions are no longer required to set aside 1% of funding for mission-specific education efforts
- Instead, Cooperative Agreements for **thematic** educational **content** and activities were awarded in late 2015.
- Missions can still set aside funds for communications or fund additional education as needed.
- Full SMD Education awardee list:
<http://www.nasa.gov/feature/list-of-science-education-partners-for-nasa-stem-agreements>

What Continues under New Plan?

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- **Communications**

- Earth Right Now
- Earth Observatory
- Science Visualization Studio

- **Education**

- Funded Projects from 2015 CAN Awards
- The GLOBE Program
- MY NASA DATA
- S'COOL
- Office of Education Efforts: NIFS, Educator Professional Development, STEM Engagement activities, and Outreach Events

New Communication Priorities

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NASA Communications Agency Communications Priorities



Earth Right Now. *Your planet is changing. We're on it. #EarthRightNow*

NASA's fleet of satellites, its airborne missions and researchers address some of the critical challenges facing our planet today and in the future: climate change, sea level rise, freshwater resources, and extreme weather events.



ISS. *Off the Earth, for the Earth. #ISS*

The International Space Station is a blueprint for global cooperation and scientific advancements, a destination for growing a commercial marketplace in low-Earth orbit, and a test bed for demonstrating new technologies. The space station is the springboard to NASA's next great leap in exploration, including future missions to an asteroid and Mars.



Mars. *Join us on the journey. #JourneytoMars*

We are on a journey to Mars. Today our robotic scientific explorers are blazing the trail. Together, humans and robotics will pioneer the next giant leap in exploration.



Technology. *Technology drives exploration. #NASATech*

We develop, test and fly transformative capabilities and cutting edge exploration technologies. Our technology development provides the onramp for new ideas, maturing them from early stage through flight and giving wings to the innovation economy.



Aeronautics. *NASA is with you when you fly. #FlyNASA*

Every U.S. aircraft and air traffic control tower uses NASA-developed technology. We're committed to transforming aviation by reducing its environmental impact, maintaining safety, and revolutionizing aircraft shapes and propulsion.



Solar System and Beyond. *NASA: We're Out There. #NASABeyond*

NASA's exploration spans the universe. Observing the sun and its effects on Earth. Delving deep into our solar system. Looking beyond to worlds around other stars. Probing the mysterious structures and origins of our universe. Everywhere imaginable, NASA is out there.

Science Directorate Education Scope

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Focus on providing many opportunities to involve educators (formal/informal), reaching students and the citizen science community, in real world science.

The SD EPO Team...

- Collaborates with the education community to bring authentic Earth science practices and real-world data into the classroom.
- Provides Learners with unique NASA experiences, engaging activities, and advanced technology.
- Provides products developed and reviewed by science and education experts.

Our goals include inspiring the next generation of Science, Technology, Engineering and Mathematics (STEM) professionals and improving STEM literacy by providing innovative participation pathways for educators, formal and informal, to reach students and the public.

CERES, Engaging Educators, Students and Public Learners for the past 19 years

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If you don't collect a data point now, you will never be able to collect it again

MY NASA DATA Over the Year

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New Data Available in the Live Access Server! [Explore](#)

Like 265 Tweet 74 Pin it Share 68

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION NASA

MY NASA DATA

.....Mentoring and Inquiry using NASA Data on Atmospheric and earth science for Teachers and Amateurs.....

MY NASA DATA

Google™ Custom Search

Home

Explore DATA (LAS)

Lesson Plans

Data Sources

MND Advisory Board

Science Glossary

MND Team Page

Mission

Mission Support

Earth Systems Poster

EM Spectrum Diagram

Latitude/Longitude Finder

Global Climate Change

Observe Your World

MND News

What Do you Soil Moisture

Over 200 Data Sets that will fit into any Science Classroom!

Don't see what you're looking for? [Suggest a parameter](#)

Earth System Digital Poster 2005-2013

Data Access Animations Activities

Photos Connect Apps Contact

MY NASA DATA

Activities Project Ideas Science Practices Radiation & Energy Weather and Climate More...

Explore NASA Data Lessons Data Tools MND Missions People

Customize your Data

Create color animations and more for your classroom activities

[Make an Animation](#)

MYNASADATA

MY NASA DATA (MND)'s tools allow anyone to access real NASA Earth science data. Through the use of MND's Live Access Server (LAS) data viewer, you can create a variety of charts, plots, and graphs to explore the Earth system and answer research questions. MY NASA DATA is also ideal for the classroom, offering a large number of lesson plans, tools, and resources. We're here to bring NASA's Earth science mission into the hands of teachers, students, researchers and citizen scientists.

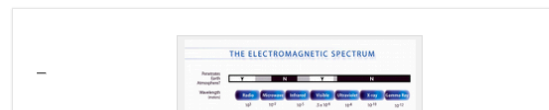
Contact Us!

Our systems have been updated. We've been down for a while now. Let us know if you have any questions.

[Contact](#)

QUICK LESSON PLANS

Here's a listing of our most popular lessons that we've converted for you to use without the Live Access Server. These lessons were developed during

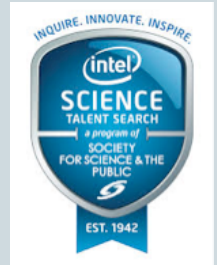


MY NASA DATA What's Next

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Moving Forward...

- NESEC asset for multiple applications to get NSAS Earth Science into the hands of Educators and Students.
- Collaboration with Intel ISEF and the Creation of the NASA Earth System Science Award Criteria
- Mission Earth partnership, vertically integrating NASA assets and resources across grade band and developing an effective educator professional development model.



Students' Cloud Observations On-Line (S'COOL) Over the Year

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S'COOL & GLOBE Collaboration Insights from S'COOL Participant Educators

In the summer of 2015, S'COOL conducted in-depth one-on-one interviews with educators who participated in the S'COOL Project alone or with The GLOBE Program. The small number of interviewees ensured NASA compliance with the Paperwork Reduction Act, and also enabled a collection of deep, rich qualitative data from respondents. Teachers represented primarily elementary and middle school classrooms, the key grade bands for which S'COOL heavily focuses on curriculum and standards. Educator input and feedback may serve as a helpful guide for S'COOL and GLOBE work together in the future.

Teachers recognize the value of GLOBE and the new opportunities that it will bring to S'COOL, but hope to maintain S'COOL's unique strengths (which are particularly relevant at elementary levels).

"By teaming up with GLOBE, both systems gain and become better educators"

Teachers perceive that:

- S'COOL is a smaller, simpler, more focused program that is a very strong fit for elementary grade bands, in terms of both curriculum standards and prerequisite student skills.
- The advantages of S'COOL include an accessible, helpful team that provides one-on-one assistance; ideal alignment between cloud observation activities and the elementary/middle school curriculum; and the ROVER citizen scientist pathway.
- GLOBE is a larger, more complex program with a rigorous protocol approach that is a better fit for older students.
- The advantages of GLOBE include a larger, worldwide presence; the ability to observe mid-day; data access and visualization tools; inclusion of other parameters beyond clouds; and the ability for students to log in to the site separately from their teachers.

Teachers are concerned that:

- The changing relationship between S'COOL and GLOBE may cause some confusion among S'COOL participant teachers who are not already familiar with GLOBE.
- S'COOL's content that supports learning (including teacher implementation tips, lesson plans, and activities) may be difficult to find or access within the GLOBE structure.

Teachers suggest that:

- Both programs could benefit from a "Venn diagram" approach where S'COOL maintains its strengths and approach but incorporates the advantages of GLOBE, listed above.

Findings from an evaluation study conducted by Ann Martin, PhD, Program Evaluator, in collaboration with Sarah McCrea, Education Outreach Coordinator, of Science Systems & Applications, Inc. (SSAI).

Students' Cloud Observations On-Line
<https://scool.larc.nasa.gov>

S'COOL

Manuscript (Word file)

[Click here to download Manuscript \(non-LaTeX\) BAMS2016PubFINAL.docx](#)

CERES S'COOL Project Update:

The Evolution and Value of a Long-Running Education Project

With a Foundation in NASA Earth Science Missions

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Students' Cloud Observations On-Line (S'COOL)

What's Next

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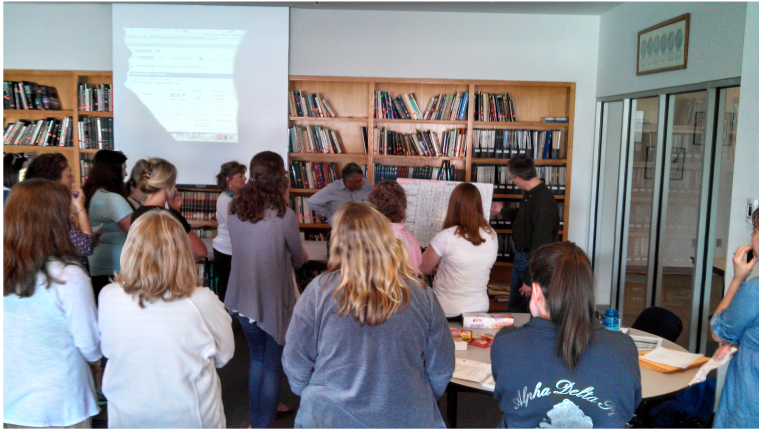
Moving Forward...

- S'COOL integration into the GLOBE Program
 - Formal application: Updated Cloud Observation Protocol, NEW hard copy materials, training slides, online data input, communication to internal and external GLOBE community, training opportunities around NEW cloud protocol
 - Informal application: Clouds is the first protocol translated to the GLOBE Observer APP, designed to extend GLOBES audience and participation
- Mission Earth partnership, vertically integrating NASA assets and resources across grade band and developing an effective educator professional development model.



CERES, Engaging Educators, Students and Public Learners for the past 19 years

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You can Observe
You can Analyze
You can Be A Scientist



The Value of Science

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*There is value in Science/Science Community
Participation in Education and
Public Engagement!*

CERES, Engaging Educators, Students and Public Learners for the past 19 years

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- Research shows that students benefit greatly from being involved in scientific inquiry, because they model the actual scientific process and they are more engaged in the learning environment.
- Students learn how to collect data, interpret data, analyze data, think about the data and what might have affected the data, and present their data



Science Communication

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- **Why should you care about being a good science communicator?**
 - Advancement of Science (Audience: Scientists)
 - \$\$\$ (Audience: Scientists and Science Leadership)
 - \$\$\$ (Audience: Congress & the Public)
 - Inspiring Other to Care about Science (Audience: Public & Students)

What's Next Knowing Your Audience

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- We often are asked to give public talks, but if you've done these, you know that it's very different than a science team talk
- We are available as a resource to help you tailor your talk for your audience, and to hone your message points

Knowing Your Audience

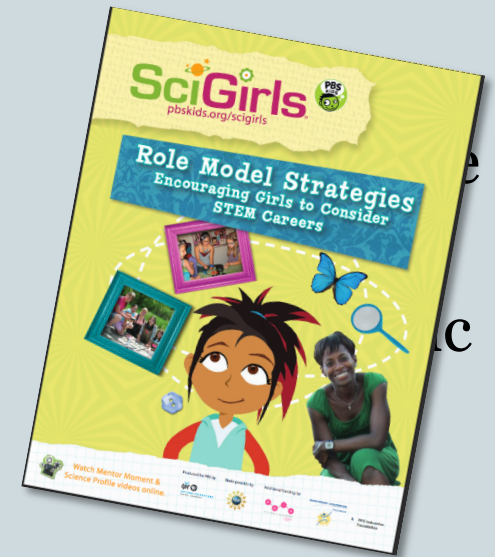
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- Communicating your science is *your* responsibility
- Think about the take away first. Imagine that your audience asks “So What?” at the end, and design your talk backwards from there
- Tell a story: Think about the character, setting, conflict, plot, theme http://users.aber.ac.uk/jpm/ellsa/ellsa_elements.html
- Don't use jargon
- Share challenges and rewards
- Talk about your career path: Working hard and growth, team work, valuable courses, when did you “know” what you wanted to do, are there opportunities for internships

Knowing Your Audience and STEM Engagement

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1. Make personal connections to dispel stereotypes.
2. Use positive messaging to show how STEM makes the world a better place.
3. Share your passion.
4. Make it hands-on and interactive.
5. Foster a growth mindset and perseverance
6. Show the way: offer resources and guidance.
7. Follow-up and invite feedback.



Knowing Your Audience: Education

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- Many schools in the U.S. are adopting or considering the Framework for K-12 Science Education (which underpins the Next Gen Science Standards)
- One aspect of this framework is the Process of Science

Science & Engineering Practices for K-12

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Knowing Your Audience: Education

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- It is important to share your process:
 - How did you decide to study this question?
 - How did you figure out this was a testable hypothesis?
 - When did you decide you knew something worth sharing with others?
 - What did presenting your research/feedback from others tell you about your results?

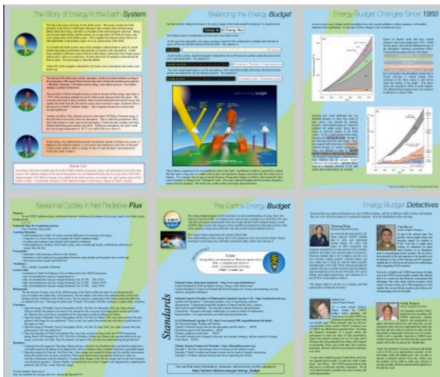
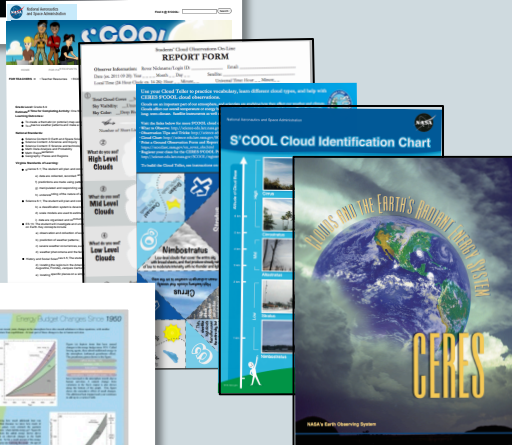
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Resources

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- OASIS Resources Catalog or contact the SD Education team:
 - Hardcopy Handouts
 - Activity Kits
 - Table Demonstrations
 - Presentation Content
 - Web resources



How You Can Share Your Science Story!

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Why is observing, studying, and monitoring clouds important?

How You Can Share Your Science Story!

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- Collaborate with the SD Education Team throughout the year
 - GLOBE Integration Home Page Videos
 - NWA Conference 9/2016, Weather Fest and Technical Talks
 - Professional Development
 - Research
 - Etc...

Thank YOU!

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We are here to help support your efforts!
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Sarah McCrea

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